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gain definite ideas of physical growth, strength, and development, which form the basis of their judgments in science, history, geography, and sloyd work. Incidentally such standard units of measurement as the foot, yard, pound, quart, and gallon are functioned through use.

Drill in mathematics is understood by the child as a means of helping him to overcome obstacles between himself and a desired goal.

Two hours each week the children will work in the sloyd room under the direction of Mr. Carley or Miss Champlin. During this time they will construct in wood the apparatus necessary for immediate use in their work—such

as the stretcher-frame for art work and the clinometer.

During the library periods the children will use books, pictures, and maps under the direction of Miss Warren and the teacher in the Model School.

Without further explanation it will be found that the outline of Miss Cooke in literature, and that of Miss Hollister in art, Miss Payne in music, and Miss Crawford in physical culture are based upon the same principles. They illustrate not only the individual methods of each teacher, but also show that all are dominated by the same general spirit and purpose.

## Nature Study in the Model School

Harriet Towle Bradley

Special emphasis will be placed upon field work. It is desirable that the teachers observing the work be as familiar as possible with the experiences and problems of the children. For that reason the region selected for study will be that about Winnetka, described in the syllabi of the departments of Geography, Nature Study, Mathematics, and Art, as well as the immediate environment of the school.

All of the class-room work of the children will be based upon the experiences gained by them during the field trips. Indoors and in the field the aim will be to have the children give full expression to their thoughts and feelings in art, language, dramatic representation, and song. The object of the summer's work is that the children may realize and thoroughly enjoy the beauty of the summer landscape.

### Field Work for Both Grades

**Three phases of field work will be considered :**

I. The topographic forms of the region visited, namely: 1, the upland; 2, the ravines; 3, the lake cliff; 4, the beach; 5, the old beach ridges; 6, the swamps. The most important features of this work will be: (a) Sketching with crayon and water colors. (b) Taking photographs. (c) Collection of stones found on beach and bluff, and of specimens of soil

from each area. (d) A trip to the Winnetka observatory, where a view showing general topographic relations can be obtained.

II. The vegetation of the region. Characteristic floras of: 1, the prairie; 2, the swamp; 3, the upland forest; 4, the ravine; 5, the lake cliff; 6, the beach ridge; 7, the present beach. The main features of the work will be: (a) Painting of the different areas to show character of vegetation. (b) Sketching trees, shrubs, or herbs which have special significance in any of the areas. (c) Taking photographs of typical tree forms, lianas, etc. (d) Collection of twigs, leaves, roots, seeds, mosses, bowlders with lichens, specimens of different woods. (e) Games and songs for the field. (f) Dramatization of stories and myths.

The children will also make one trip to the Field Columbian Museum to see the economic products of plants.

III. Animal life of the region. A study of the various animal forms found in the different areas. 1, the swamp; 2, the forest; 3, the prairie; 4, the stream; 5, the beach; 6, the lake. (a) The food of the various animals and their ways of obtaining it. (b) Their homes and means of protection. (c) Their range and means of locomotion. The main features of the work will be: (a) Record of the birds in color. (b) Imitation of bird notes. (c) Dramatization of stories and myths. (d) Collection of insects, frogs, etc., for study in the schoolroom whenever the proper food can be obtained.

In connection with this work the children will visit the Lincoln Park Zoölogical Gardens and the Academy of Sciences.

### Suggestive Problems upon the Winnetka Area

(1) Comparative depths and widths of the ravine near mouth and source of stream. (2) Angle at which tributaries enter main stream. (3) The height of the line of winter drift-wood on the beach. (4) Proportion of the different kinds of trees found on given area, on beach, cliff, upland, ravine slope, swamp, beach ridge. (Make diagram showing same.) (5) Per cent of leaves of different trees, shrubs, and herbs which are used for food by insects; per cent used as homes. (6) Amount of soil brought up by earth worms on different areas selected. (7) Amount of water retained by various soils during a rain. Amount evaporated in a given time. Amount of organic matter in soils. Amount of sand, gravel, clay, etc. (8) Using data obtained in (7), calculate and put in tangible form the amount of organic matter, water, etc., found in the surface soil of areas studied (see 4). (9) Comparison of new growth of different plants studied. (10) Comparison of area of leaf surface relative to amount of transpiration as found by experiment.

### Indoor Work

The initiative of the children, as illustrated by their interest and questions, will be recognized as the fundamental basis of all experiments, and of reading, writing, and number. On the other hand, the teacher must prepare to present the best possible conditions for self-activity, and be ready to meet and encourage the children at every step. The child may or may not follow the plan of work mapped out here. It is flexible and subject to daily change.

The first and fourth grades will necessarily meet the same general problems upon their field trips. Their work will be determined by their interest, mental power, experiences, and physical strength.

The fourth grade will study the topography of the region, construct simple maps or diagrams to show vegetation, and model in clay, to a given scale, a section of each of the typical regions—swamp, prairie, forest, stream, cliff, and beach.

They will also construct a background of paper, upon which will be represented in water color the general appearance of the landscape and the types of plants, birds, and insects characteristic of each section.

The first grade children will bring their collections of soil, stones, water, plants, and animals to these models, and test their observation by attempting to distribute them properly. They will be assisted and supervised by fourth grade children.

It is not intended that these models shall be finished fac-similes of the sections represented; they are designed merely to aid the children in recognizing the fundamental relationships of the animals, plants, and soils of the various localities. In this way the children will have their data and collected material roughly classified in groups and their indoor work will consist in comparing the groups as to their chief characteristics.

In connection with all of the work experiments will be made which will help the children to answer the questions which arise in the field and class-room. Directions for such experiments will be type-written for the use of the teachers who wish to observe the work.

Reading matter in connection with the work will be selected from literary sources. The necessary notes and records will require daily exercise in written expression. The records and paintings will be preserved in portfolios made by the children.

The probable points for observation and discussion will be:

- I. The comparison of stones. Classification as to locality. Examination of stones from different areas as to size, color, form, constituents and amount of weathering. Reasons for differences. Comparison of these stones with those in common economic use.

- II. The comparison of soils. Classification as to locality. Examination of constituents of each kind of soil by sifting, washing, and burn-

ing. Investigation of the properties of the various soils. Inferences as to the function of each.

III. Comparison of plants. Classification as to locality. Comparison of herbaceous plants of the different areas as to roots, stems, and leaves. Recording of obvious reasons for the differences noted. Comparison of trees found in different areas. Examination of twigs to show manner and rate of growth; relation of trees to birds and insects; recording of observations in writing, drawing, and painting. Economic value of trees, wood, fruit, seeds, bark and roots.

IV. Comparison of animals. Classification as to locality. Record of insects seen. Method of

identification. Insects which aid plants. Insects which injure plants. Work of animals in the different soils. Record of birds seen. Identification from description. Imitation of bird notes. Comparison of birds seen as to: (a) Manner of flight. (b) Kind of food. (c) Manner of nesting.

At the end of six weeks a stereopticon entertainment will be given by the children. In it the children of each grade will describe what they have seen, done, and made for the benefit of the others, and this entertainment will be the apparent motive for some of the close observation at the Museum and in the field. Many of the slides used will be made from pictures taken upon the trips.

## Geography for the Fourth Grade, Correlated with the Study of Local Conditions

Katharine M. Stilwell

Motive—To show the relation of shore lines to the settlement and development of any region. Material—Writing, painting, drawing, and modeling material, compass, clinometer, pictures, camera, stereopticon, maps, reading matter, and materials for the various experiments to be made. Method—Field work and class discussion.

**I. Field Work.**—1. Shore of Lake Michigan north of Chicago, sandy beach at Edgewater, cliffs at Winnetka, coastal plain at Waukegan, Ill., and the sand dunes at Dune Park, Ind. 2. Points to be observed: (a) Shore currents and the processes of erosion in cliffs, terraces and cliffs; the starting of river valleys in the form of gullies. (b) The formation of beaches, spits, barriers, terraces, dunes, and deltas. 3. Children sketch the various forms observed. 4. Collect specimens of rock, sand, and pebbles. 5. Photograph salient features for further study.

**II. Class Study** will be continued by means of oral discussion and other forms of expression, as partially indicated below, and by the use of stereopticon views, and other pictures presented by the teacher. 1. Expression—Making clinometers and field bags. Painting or sketching the various land forms, and illus-

trating erosion and deposition. Drawings illustrating experiments. Modeling the land forms observed. Experiments as needed to explain points under consideration. Children will be led to devise their own experiments. Writing used continually as a means of expression of thought. Reading papers written by children, as well as articles from different sources, giving information on the topics of study. This reading will be used (a) to supplement the knowledge gained by observation, (b) as a means of acquiring information not otherwise to be gained.

2. Points to be considered: (a) Situation of Chicago with reference to the lake shore; cause of this location. (b) Topographical features of the lake shore. The character and amount of work done on the following topics will be determined by the attitude of the class toward it:

(b<sup>1</sup>) Littoral Erosion. Agent—The wave. Process—(Class observe. Illustrate). Conditions favoring and retarding erosion. Effect of gravity. Weathering. Forms of land produced by erosion. Sea cliffs and wave-cut terraces.

(b<sup>2</sup>) Littoral Transportation. Agent—Joint action of waves and currents. Observation as to method. Direction of wind. Shore drift or beach, and barriers; relation of the two; history of lagoons. Class will determine